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Patent

## IN THE UNITED STATES RECEIVING OFFICE (RO/US)

PCT/US2003/024165

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International  
Application No.International  
Filing DatePriority Date  
Claimed"WEAR RESISTANT GRINDING MACHINE COMPONENTS"

Title of Invention

Steven G. Smarsh, et al.  
Applicant(s) For RO/US

COPY

International Bureau of WIPO  
Attention: Gijsbertus Beijer - Carlos Roy  
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Facsimile No. 011-41-22-740-14-35Mail Stop PCT  
Commissioner for Patents  
Attention: RO/US, Ling X. Xu  
PO Box 1450  
Alexandria VA 22313-1450  
Facsimile No. 703-305-3230**ARTICLE 19 AMENDMENTS**

Dear Sir/Madam:

These Article 19 Amendments have been made in response to the International Search Report issued 21 January 2004. The claims have been amended to more clearly define the invention over the prior art turned up in the International Search Report (substitute sheets included).

Therefore, the following amendments have been made, and substitute sheets are being offered herewith as follows:

## FACSIMILE MAIL CERTIFICATE

Date of Deposit: March 22, 2004

I hereby certify that the following attached papers and/or fee are being deposited with both the International Bureau of WIPO on the date indicated above via facsimile to the facsimile number of record, i.e. 011-41-22-740-14-35, and the Commissioner for Patents, Mail Stop PCT, on the date indicated above via facsimile to the facsimile number of record, i.e. 703-305-3230, and is addressed to "International Bureau of WIPO, Attention: Gijsbertus Beijer - Carlos Roy, 34, chemin des Colombettes, 1211 Geneva 20, Switzerland, Facsimile No. 011-41-22-740-14-35", and "Mail Stop PCT, Commissioner for Patents, Attention: RO/US, Ling X. Xu, PO Box 1450, Alexandria, VA 22313-1450, Facsimile No. 703-305-3230".

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Name

Signature

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Article 19 Amendments  
March 22, 2004  
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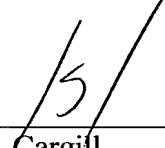
IN THE CLAIMS

All the claims have been amended on pages 17 - 19 so as to more clearly define the invention. No new matter has been incorporated into the amended claims.

Therefore, Applicants request the International Bureau of WIPO to substitute these sheets into the application post-Publication. Thank you in advance for your kind consideration.

Respectfully submitted,

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CLAIMS

COPY

What is claimed is:

- 5                   1.       A wear resistant grinding machine component, comprising:  
                    a grinding machine component made of a material selected from the  
group consisting of carbides, nitrides, oxides, borides, ceramics, cermets, carbonitrides,  
carbon diffused materials, including steel, nitrides, borides, oxides, other metals and surface  
treated ferrous compounds.
- 10                   2.       An extremely high precision wear resistant grinding machine  
component for a high precision centerless grinding machine, comprising:  
                    a grinding machine component having at least an exterior surface  
comprised of an extremely rigid and very hard, non-flexing material selected from the group  
15 consisting of ceramics, carbides, nitrides, borides, oxides, oxynitrides, carbonitrides, alumina,  
cermets, carbon diffused materials, including steel, nitrides, borides, oxides and surface  
treated ferrous compounds, and combinations thereof,  
                    wherein the at least exterior surface of the grinding machine  
component may include a surface selected from the group consisting of the entire component  
20 being made of a ceramic material, a coating of a ceramic material on a metallic substrate  
base, a sleeve of ceramic material adhered over a metallic substrate base, a grinding machine  
component made of a cermet material, and a surface treated metallic substrate base formed  
into a grinding machine component.
- 25                   3.       The grinding machine component of claim 1, wherein the grinding  
machine component is selected from the group consisting of tension rods, transfer ways,  
spindles, spindle housings, pivot rods, threaded shaft rods, concentric shaft seals, lead screws,  
and combinations thereof.
- 30                   4.       The grinding machine component of claim 1, wherein the grinding  
machine component is non-flexing and maintains a very high tolerance of from about  
0.000005 inch to about 0.000030 inch.

5. The grinding machine component of claim 1, wherein the grinding machine component enables a repeatability factor of from about 0.000005 inch to about 0.000030 inch.

5 6. The grinding machine component of claim 1, wherein the grinding machine component is made of a metallicly infiltrated cermet material made from a spongy ceramic and then infiltrated with a molten metal which is thereafter allowed to solidify within the matrix of the spongy ceramic.

10 7. The grinding machine component of claim 1, wherein the grinding machine component further includes a metallic component to increase the strength of the component.

15 8. The grinding machine component of claim 7, wherein the grinding machine component further includes a metallic component selected from the group consisting of cobalt, vanadium, chromium, manganese, nickel, copper, zinc, molybdenum, cadmium, indium, tin and combinations thereof.

20 9. The grinding machine component of claim 7, wherein the grinding machine component further includes a metallic component in a concentration of from about 1 to about 50 percent by weight.

25 10. The grinding machine component of claim 1, wherein the grinding machine component further includes a magnetic component including a component selected from the group consisting of powdered iron, niobium, yttrium and combinations thereof.

11. The grinding machine component of claim 10, wherein the grinding machine component further includes a magnetic component in a concentration of from about 1 to about 25 percent by weight.

30 12. The grinding machine component of claim 1, wherein the grinding machine component made of a surface treated metallic substrate base formed into a grinding machine component includes forming a hard surface layer on a ferrous alloy by a method selected from the group consisting of carburizing and carbonitriding.

13. The grinding machine component of claim 1, wherein the grinding machine component made of a surface treated metallic substrate base formed into a grinding machine component by carburizing is accomplished by carburizing by a method selected from the group consisting of gas carburizing by placing in a carburizing gaseous atmosphere, 5 pack carburizing by placing all the with surfaces in contact with a solid compound, and combinations thereof.

14. The grinding machine component of claim 1, wherein the grinding machine component made of a surface treated metallic substrate base formed into a grinding 10 machine component by carbonitriding by dissociating ammonia into hydrogen and nitrogen.